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Cultivating Leadership into Secondary Mathematics Classrooms: Putting Belief into Practice

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Abstract

Effective leadership is critical for the success of an educational organization. Leadership is also one of the key professional responsibilities of teachers. However, leadership often remains an abstract concept even for teachers in leadership positions owing to administrative tasks, day-to-day issues, problems reaching students' achievement targets, and demanding deadlines. Therefore, this study aims to identify the most common type of leadership possessed by secondary mathematics teachers in Brunei Darussalam. We also investigated whether mathematics teacher-leaders are putting their beliefs into action in their teaching practice. There were three leadership styles identified in the study: Autocratic, Democratic and Laissez-faire. In order to meet the objectives of this small-scale case study, a questionnaire was adapted and distributed to 17 secondary mathematics teachers in two secondary schools in Brunei Darussalam. Pearson's correlation was used to identify the factors affecting teacher's leadership style. One finding from the quantitative analysis indicated that teachers are more likely to adopt the autocratic style of leadership as their teaching experience of mathematics increase. On the other hand, the qualitative part of the study involved two classroom observations and further interviews with two selected teachers from each of the participating schools. The analysis revealed that the two teachers, who practiced democratic and autocratic leadership styles respectively, do put what they believe into their classroom practices.

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1. Introduction

The education system in Brunei Darussalam has recently undergone a major educational reform known as *Sistem*

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Pendidikan Negara Abad Ke-21, and in the English Language, it is known as the National Education System for the 21st Century (and better known as SPN21) (Ministry of Education, 2013; Mahadi & Shahrill, 2014; Mundia, 2010, 2012; Omar et al., 2014; Salam & Shahrill, 2014; Shahrill & Clarke, 2014). Part of the rationale for the implementation of SPN21 in 2008 by the Ministry of Education was to raise students' achievement in Mathematics. Mathematics is one of the core subjects taught in this country (Hamid et al., 2013; Shahrill, 2009; Shahrill et al., 2013; Shahrill, Abdullah et al., 2014). The Ministry of Education's vision for SPN21 can only be realized if it is also the teachers' vision. Thus, we believe that teachers should also be the leaders who understand and support this rationale fully, in order to achieve the SPN21 objectives (Shahrill, Jaidin et al., 2014). In other words, in line with the Ministry of Education's vision, we feel that it is crucial to be committed to developing, supporting and sustaining the highest quality leadership possible in schools across Brunei Darussalam.

As teachers, effective leadership is critical for the success of educational organization. Furthermore, leadership is one of teachers' key professional responsibilities. However, in facing many administrative tasks, day-to-day issues, problems in meeting students' achievement targets, and demanding deadlines, leadership often remains an abstract concept even for teachers holding leadership positions. Many teachers experience the push and pull of their complex roles, which are located somewhere between their administrative role and their role as educators. However practicing good leadership is critical as a teacher because teachers have extraordinary influence in their own classrooms.

Leadership, however, is not just a function of the mind. What a teacher-leader believes is not necessarily reflected in his or her teaching practices in the classroom. Just as learning does not exist only as a cognitive task, leadership also demands action. There needs to be self-knowledge and also the courage to act on that knowledge in leadership. From our observations of some of the secondary schools in Brunei Darussalam, most teachers are given administrative tasks on top of their responsibilities to educate (Kani et al., 2014; Shahrill, Kani & Nor, 2013; Tsang, Mohammad Malik Finti & Shahrill, 2014). Many teachers recognize that this may not be a suitable avenue for them; the job of an administrator may entail work that do not interest them. However, it may be that teachers have the urge to exercise wider influence within their profession; according to Schuman (2010), this desire for greater responsibility, if left unfulfilled, can lead to frustration and even cynicism. Therefore, it may be said that what a teacher went through in his or her career has made him or her, the kind of leaders he or she is today. However, this may not be true in some cases.

The unprecedented demands being placed on schools today require leadership at every level. Yet many schools are still organized as though administrators make all the important decisions but their own teachers are the ones responsible in carrying out the tasks. Teachers themselves need to be leaders. Effective leaders know the importance of taking care of themselves so they can take care of others. The first problem may lie with how some teachers adopt ineffective leadership styles in their classroom.

This paper aims to discover the common types of leadership possessed by secondary Mathematics teachers in Brunei Darussalam. The Mathematics teachers will be classified into three established leadership styles, which are Autocratic, Democratic and Laissez-faire leadership styles. All leaders are known to fall into one of the three leadership styles. Unfortunately, having the knowledge of what kind of leadership style one has does not necessarily mean that the knowledge is being put into action. Therefore the qualitative part of this paper will investigate whether teachers are putting their beliefs into action.

This is a small-scale study that aims to answer the following questions. What are the common leadership beliefs held by Mathematics teachers in Brunei secondary schools? What are the factors that affect teachers' style of leadership practice in the Mathematics classroom? And do teachers practice what they believe?

2. The leadership styles

Lewin, Lippit and White (1939) conducted a study that determined the three major leadership styles which are Autocratic, Democratic and Laissez-faire leadership style. While other research has identified specific types of leadership styles, the study by Kurt Lewin and colleagues were very influential in establishing and determining the three major leadership styles. They stated that Authoritarian leaders provide clear expectations on what needs to be done, and how it should be done. The Authoritarian style is characterized by power, domination, pressure, and criticism. According to the researchers, Authoritarian leadership is best applied to situations where there is little time for group decision-making or where the leader is the most knowledgeable member of the group (Lewin et al., 1939).

The study by Lewin and colleagues also found that the Democratic style to be the most effective leadership style. Democratic leaders develop students' self esteem by involving them in the decision-making process, requiring them to take responsibility for their own actions, and encouraging them when they take risks and make mistakes. Students are motivated from within rather than from the demands of their own teachers. At the opposite end of the spectrum is the Laissez-faire leader who is completely permissive. According to Lewin et al. (1939), teachers who adopted Laissez-faire style of leadership allow the students to behave however they want, which generally leads to classroom chaos. This causes student frustration, a high level of stress, and a feeling of being totally overwhelmed and lost. Teachers are unable to teach because they do not have control over the class and they are generally unsuccessful in making the students ready to learn.

There is a significant lack of literature concerning the factors that affects leadership style. Maslow's (1943) theory on hierarchy of needs, however, highlights how there are different stages of growth in humans. One of the factors that affect leadership style is 'the necessity for change.' Some of the factors may develop naturally, while others are the product of the leader's environment. Some leaders may even need to adjust their leadership style to adapt to a changing culture. Leaders usually develop their leadership style situationally when there are factors that affect and force them to grow. Furthermore, Maslow (1943) stated that the factors described goes beyond the scope of the basic needs and instead motivates people to strive for constant betterment.

3. Methodology

3.1. Instrument design

The questions for the survey were adapted from the book entitled 'Introduction to Leadership: Concepts and Practice' by Peter Northouse (Northouse, 2012). The original questionnaire has been widely used by several researchers. However, in this study, it was further adapted to fit the Bruneian context for secondary Mathematics teachers, namely by eliminating the neutral Likert scale from the original questionnaire to obtain stronger data.

3.2. Procedure

The questionnaire was distributed to Mathematics teachers in two secondary schools in Brunei Darussalam. Responses were given a point value to determine the style and strength of the each teacher's leadership style. There were 17 Mathematics teachers (16 female and one male) who voluntarily responded to our questionnaire. To answer the third research question, the second part of the study involved two class observations and further interview of two teachers from each school. Questions asked in the interview were adapted from Cherry (n.d.). Only parts of the interview were transcribed for the purpose of this study.

3.3. Limitations of the study

The small number of teachers participating, as well as the limited number of teachers observed, limits the generalizations that can be made from the present study. The observational method used in this study makes the assumption that researchers will get an accurate picture of the teacher's leadership style used in the classroom by observing the teacher during one hour of their time. Many teachers become nervous when being observed and their performance may suffer. Thus, the result of these observations can often be distorted data. The last factor that might influence the reliability of the data is the fact that only one male teacher participated in answering the questionnaire survey. This might limit the study predominantly to female mathematics teachers only. Therefore, gender cannot be taken as a factor that affects the style of leadership in this study.

4. Results and discussions

4.1. Results from the survey

Figure 1 illustrates the distribution of leadership styles among the participants. More than half the participants (59%) are believed to practice Autocratic leadership in the classroom, followed by Democratic style of leadership (35%). The least common style of leadership practice in the classroom Laissez-faire leadership with only 6%.

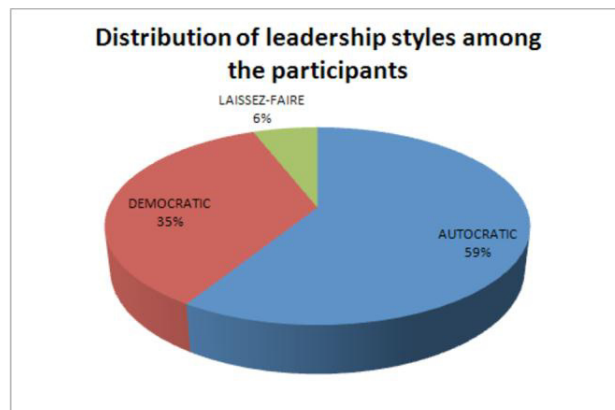


Figure 1: Distribution of leadership styles

Figure 2 shows that 23% of the participants in the study are in their early 30s. The average age of the participants is 32 years old.

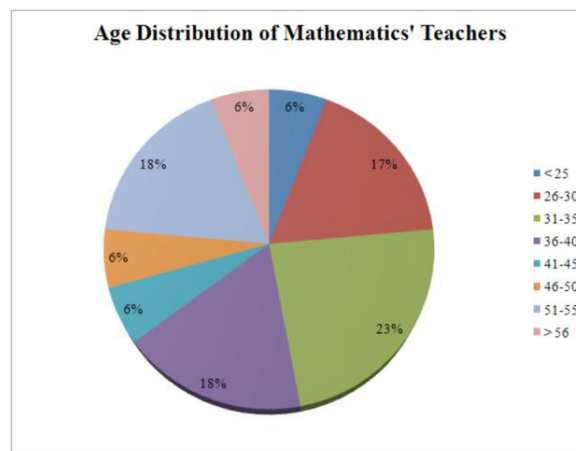


Figure 2: Age distribution

Figure 3 summarizes the teaching experiences (in years) of the teachers in the two secondary schools. Participants do not necessarily only teach the subject, Mathematics, during their teaching career. It can be observed from Figure 3 that their overall teaching experience may differ from their teaching experience of Mathematics. The teachers in the study have an average Mathematics teaching experience of 14 years.

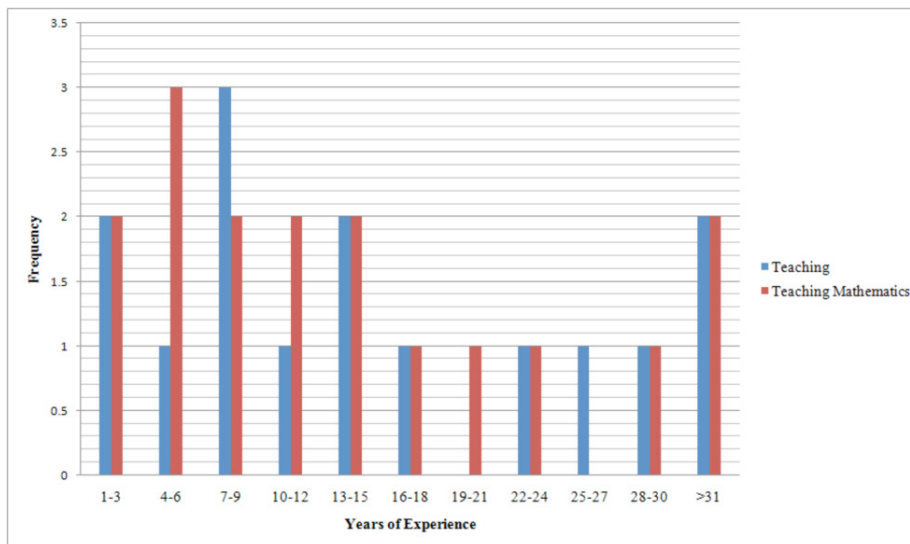


Figure 3: Teaching experience

Figure 4 shows the pie chart of the number of hours per week allocated in school for teaching. The distribution shows that most of the teachers (47%) spent an average of less than 14 hours in school for teaching. No (0%) teachers have spent less than 7 hours in school for teaching. The mean time allocated for the participant to teach is roughly 19 hours.

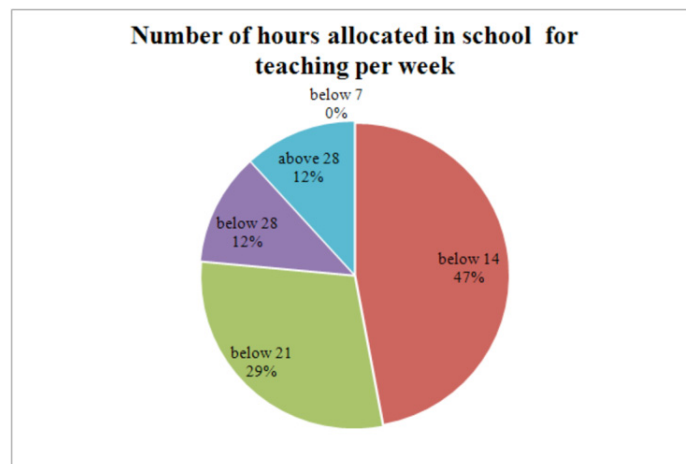


Figure 4: Number of hours allocated in school per week

Figure 5 shows that 35% of the participants do not hold any administrative post in the school. Unfortunately, 17% of the participants did not give an answer to this, so the data will be regarded as NIL. On the other hand, 6% of the participants have held an administrative post for the most number of years, namely, more than 11 years. The average number of years of experience in holding an administrative post is only 7 years.

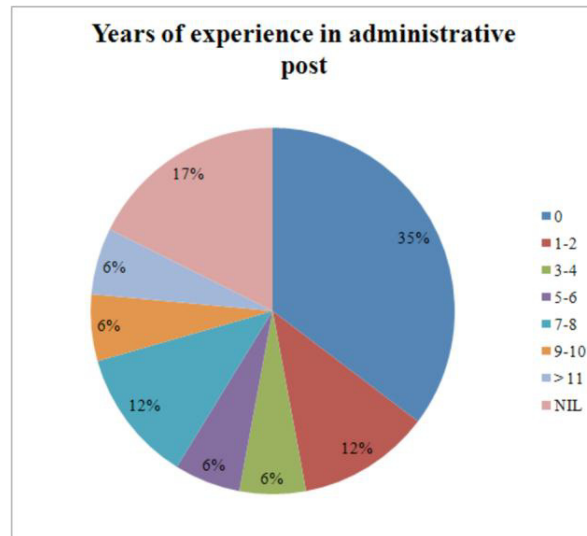


Figure 5: Experience in administrative post (in years)

Table 1 shows the Pearson correlation compared between the total score of the leadership styles against the age of the participants. There is a low positive correlation between the Autocratic leadership and the age of the participants. This shows that age of the teacher does have an effect on whether one has the Autocratic leadership style. However, the correlation test shows zero relationship between Democratic leadership and the age of participants. This is a rare situation and the small sample size (N=6) may be the cause of this result. Laissez-faire leadership was eliminated from all of the analysis due to the limited sample obtained.

Table 1. Pearson's coefficient of correlation

Relationship	Pearson's Correlation	
	Autocratic Style	Democratic Style
Leadership style vs. Age	(N=10) 0.2161	(N=6) 0.0000
Leadership style vs. Years of teaching experience in Mathematics	(N=10) 0.1272	(N=6) -0.4976
Leadership style vs. Teaching hours per week	(N=10) 0.3733	(N=6) -0.6325
Leadership style vs. Years of administrative experience	(N=8) -0.1037	(N=5) 0.8721

Note: N refers to the sample size

The data in Table 1 also shows that Autocratic leadership has low positive correlation in correspondence to the years of teaching experience in Mathematics, whereas Democratic leadership is negatively correlated (-0.4976) with the years of teaching experience. Researchers concluded that at the beginning of teaching experience, Democratic leadership style was prevalent and as the years of teaching experience in Mathematics increases, perhaps only small number of teachers would adopt Autocratic style of leadership. Table 1 further illustrates that the positive correlation of Autocratic leadership with the number of hours allocated in school for teaching has some influence on the style of teacher to be an Autocratic leader. On the other hand, Democratic leadership has a negative correlation with the hours allocated in school for teaching. This means that when time allocated for teaching is less, teachers are likely to develop a Democratic style of leadership. The low negative correlation between the leadership style and the number of years the participants hold in administrative post shows that the participants are more likely to be teacher-centred in their teaching (Autocratic leadership), as the number of years they hold in administrative post is shorter. In addition, the number of years participants hold in administrative post is highly positively correlated with the Democratic leadership. This indicates strongly that the longer the number of years participants hold in school administration, the more likely the participant practices Democratic style of leadership in the classroom.

4.2. Classroom observations

For this study, two classes from both the schools were observed. The first class observed belonged to a teacher, Mrs Lily who believed in practicing the Democratic leadership style in the classroom. The majority of the tasks involved in the lesson were to discuss students' homework on the topic 'Angle Properties of Circle'. There were 17 students in total. At the beginning of the lesson, Mrs Lily asked the students if they have attempted the problems. She carried on discussing the answers on the whiteboard by calling a few students to the front to show their working.

The other class observed belonged to Miss Siti. She is a new teacher and has only taught the observed class of 31 students for 3 months. The task for that day was to do classwork on Coordinate Geometry. Before the start of the lesson, Miss Siti went around the class to return the students' homework books. She wrote a few of the homework's solutions she assigned during the last lesson on the whiteboard. Next, she emphasized to the class to submit their class work within that week. A few students sat in groups to do the class work, but others were just hanging around the class without doing anything. Miss Siti approached each student by giving one-to-one teaching.

4.3. Analysis of reflections

Mrs Lily's leadership style in teaching can be revealed mainly through the following aspects from the lesson observation. That she believed that a class should be student-centred and interactive is particularly obvious in her lesson design, which involved frequent group discussions that addresses the major topics in the homework question. Mrs Lily provided guidance during the class discussion when students were stuck doing the problems on the whiteboard. She gave verbal motivation in terms of supportive communication by asking students intriguing questions until they were able to reason their method of problem solving to her. Most of the time, she simply instructed the students to attempt the questions on their own for a few minutes before discussing the answers. Giving the students some space and opportunity to work independently clearly shows that Mrs Lily believed that her students were capable of working out the problems by themselves. We also observed that throughout the lesson, she constantly gave encouraging remarks to the students reminding them of her personal belief, "It is okay to be wrong, they are all here to try." Overall, there was a positive environment in Mrs Lily's classroom in that students were willing to try, and likewise did not hesitate to volunteer to attempt questions on the whiteboard. Mrs Lily involved the students in the decision-making process; for example, she asked the students how long should they give student X in answering the question on the whiteboard. However, she still has the last word in discussions. From the short interview conducted with Mrs Lily, it was clear that she possess a Democratic style of leadership in her classroom, and this correlated with her belief recorded in the questionnaire.

The interview and questionnaire conducted with Miss Siti overall revealed that she possessed Authoritarian leadership in the classroom. This is reflected in the classroom observation. The one-to-one teaching in Miss Siti's class showed that Miss Siti supervised her students closely. She gave hints and taught each student as she went around the classroom because she felt that the students were insecure about their work. Although she disagreed with the statement in the questionnaire which states that teachers have to push students to do work, our observation of her teaching contrasted with what she believed. She was pushing students to finish their work by continuously emphasizing the submission deadline. Miss Siti did not assign a lot of homework to the students, but still obliged to the school rule of giving two homework assignments for each topic. During the interview, she said that she would only give more work if she thought that the students were still weak within the taught topic. This showed that she was making her own choice without getting any feedback from the students. Her leadership style in the classroom revealed that she is an Autocratic leader. While Miss Siti also possessed some characteristics of the Democratic leadership style, such as giving students the freedom to be grouped together even without her instruction, these characteristics were not as strongly observed as the characteristics symptomatic of the Autocratic leadership revealed in the classroom observation. This may owe to the few number of years she spent teaching, which correlates with the results of Table 1. As found through the statistical analysis, new teachers tend to possess Autocratic style of leadership. However, Miss Siti may develop a stronger Democratic style of leadership as the number of years of spent teaching increases.

5. Conclusion

It can be concluded from the study that the most common type of leadership style analyzed from the questionnaire is the Autocratic style of leadership with 59% support. The Pearson's correlation was used to determine if there was a relationship between teacher's leadership style and their age, between leadership style and years of teaching Mathematics, between leadership style and hours per week reserved for teaching, and between leadership style and number of years holding an administrative post. These relationships are important in identifying the factors that affect the Mathematics teachers' leadership styles. Overall, it can be seen that although the correlation values are not strong, these four factors do affect or correlate either negatively or positively to the leadership style of the secondary Mathematics teachers in the two schools sampled. An exception is the zero relationship between age and Democratic leadership, which may be due to the small sample size. From our observations, we can confirm that the two teachers do put what they believe into their classroom practice. Although the overall findings cannot be generalized to the rest of the teachers in this study, nevertheless, it can be seen that what teachers' belief can actually be reflected in the practices of their classroom teaching.

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